Campbell J. a(3)

A METHOD

OF

CONVERTING COLLODION NEGATIVES

INTO POSITIVES, BY HEAT.

BY

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METHOD, &c.

In the end of 1854, I observed that a broken glass negative changed colour on being thrown into the fire.

I then tried several experiments with small negatives. I held the glass by one corner with the tongs, and passed it gradually into an ordinary coal fire, selecting a place between the bars of the grate where there was a good red heat and no flame or smoke. By carefully and slowly drawing the glass out after it had got to a red heat, by avoiding contact with the fuel, and by holding the collodion side of the plate downwards to avoid dust, I succeeded in producing a number of positive pictures, which I varnished and backed with black varnish in the ordinary manner.

Many glasses were broken in my first attempts. Some pictures were too pale, some were yellow, some were too white; but the defects in those which escaped breakage appeared to be due rather to the chemical than the burning process, and I persevered.

I have made a number of experiments since 1854, and the result is the following process, which I have found tolerably successful.

Process.

Take a picture by the ordinary collodion process on plate glass, which stands heat better than the other kinds usually sold for photographic purposes. Carefully remove all traces of iodide of silver, which gives a yellow colour in the shadows if any is left; dry, and varnish with amber varnish.

The negative may now be used for printing in the pressure frame. To convert it into a

positive: lay the plate, varnished side upward, on a layer of pounded chalk or white sand spread evenly on an iron tray (a shovel or a frying-pan will do). Heat the whole to a dull red heat over a fire. It will be well to protect the plate from dust during the process by covering it with a bit of talc.

The layer of chalk or sand distributes the heat gradually and evenly over the plate, and diminishes the risk of breakage. The *whiteness* of the layer permits the process to be more easily watched. The varnish first smokes; the picture becomes clearer and darker, then darkens all over—turns from black to grey.

It then assumes a variety of colours, which by reflected light are very brilliant. It becomes orange in parts, then blue and purple in parts, then slate-coloured in parts, lastly green in patches, and then a white positive picture.

When the high lights are blue the shadows are generally orange, when the high lights first turn white some parts of the picture remain blue. One picture was stopped at this point, and retains some colour in the dresses. The faces and one corner were beginning to whiten when the operation was stopped, but being backed with varnish, poured on the collodion side, the colours are faint, and by lamp-light hardly visible.

When all parts of the picture first become white it is at the best.* It is then time to remove the plate from the heat, and allow it to cool gradually. Heat continued weakens the shadows by whitening them. Still more heat weakens the whole picture, probably by altering the condition of the silver.

* The rays of the sun collected in a strong burning glass act on the collodion pictures in the same way as artificial heat, and change the silver from black to white.

Seen through a microscope of strong power, by reflected light, the picture shines as frosted silver, in points of coloured light on a dark ground. The points are nearest each other in the high lights. By transmitted light the plate appears covered with a fine dust, scattered thinly in the shadows, more thickly placed in the half lights. In the high lights the silver appears as a continuous film, with small holes in it at regular intervals. Seen by both reflected and transmitted light, the silver appears like a white sand distributed on the glass, in several layers in the white lights, but scattered in the shadows and half lights

The possibility of producing photographic pictures with the natural colours by some modification of this process, has frequently occurred to me, and though I have hitherto failed to produce *local* colour, I would suggest that those who have more leisure to devote to such experiments should turn their attention to the subject. Many substances may be made to apppear of any colour by dividing them into plates sufficiently thin.

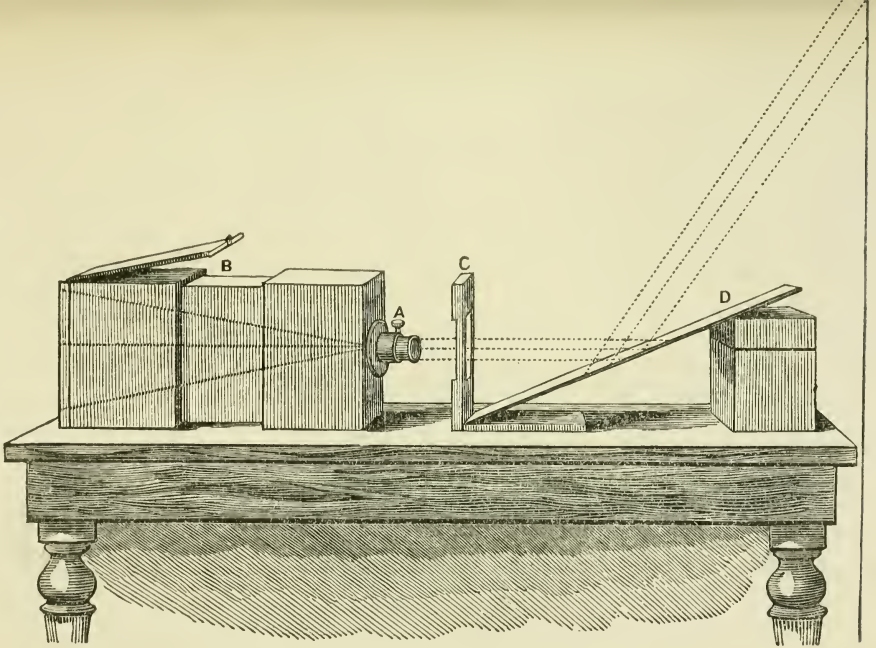
The brilliant colours which succeed each other while the collodion is burning away, probably depend on the thickness of the film through which the silver dust is seen. The rate at which the collodion burns must depend on the conducting power of the substances in contact with it, and the thickness of the film may depend on the amount of silver deposited on various parts of the plate. It may be that by some improvement of this roasting process, the film may be so affected by the silver deposited in it, as to vary in thickness to the amount which will produce colour in its proper position. I have once succeeded in stopping the process when the sky of a landrcape was blue and the trees green, but that sesult was accidental.

The uses to which this burning process can be turned are numerous. Pictures taken on metallic plates, glazed with a dark glass, would be less liable to break in heating. By fusing an enamel over the silver, photographic enamels could be produced. A gentleman who superintends the glass works of Messrs. Powell, undertook to try some experiments for me several months ago, but I do not know if he has produced enamels. The same gentleman was kind enough to allow me to use one of his furnaces, where, with his assistance, I succeeded in roasting a number of good-sized plates, with very few breakages.

I have thought that the silver might be made by a great heat to sink into the glass and produce depressions on its surface, from which, the silver being removed by acids, prints might be taken with ink.

I have tried to engrave a glass plate with fluoric acid, after removing the collodion by heat, but hitherto I have failed in my attempts at photographic engraving on glass; others may be more successful.

It may be interesting to your readers to know that transparent pictures copied in the camera, from glass negatives, make good ornaments for windows. Smaller transparencies make good slides for magic lanterns. They may be backed with white or with coloured oil paints, when they appear like drawings or oil pictures. These plates must be varnished before they are painted. When the oil paint is dry, or while wet, the pictures may, with care, be removed entirely from the glass, and kept in books, or, while the collodion is wet, it may be transferred from the glass to paper. A process for colouring paper photographs, in oils, was patented by a gentleman of the name of Duppa, some years ago.


B
A
C
D

The method of colouring transparent *collodion pictures* is preferable, but any one desirous of carrying on this process for gain, would do well to consider the terms of Mr. Duppa's patent.

The oil colouring of prints made transparent with varnish, has long been practised, but the patent, referred to, for so colouring paper photographs, may include the use of oil paints in colouring photographic drawings of all kinds.

Coloured pictures resembling oil paintings, six inches square, have been made with a part of a microscope from a negative taken from nature, with a small lens, at a distance of about twelve yards. The arrangement for copying the negative was as follows :—

The glasses were removed from an ordinary portrait lens, and the inch power of the microscope was screwed into the diaphragm (A). The brass of the portrait lens, with the inch power and diaphragm inserted, was then replaced in a long-bodied camera (B), constructed, at my request, for this purpose, by Mr. Ross, last August. The negative was placed in an upright stand (C), and a looking-glass (D) was so placed behind it as to reflect light from the sky. The whole apparatus stood on a table near a window. The advantage of taking negatives of small size, and magnifying them afterwards, is the great reduc tion in the size of the apparatus necessary.

If any of the makers of optical instruments would construct a camera to take negatives sufficiently small, a photographer might carry his whole battery in his pocket, instead of requiring a cart-load of materials as at present; but, till a special apparatus is constructed, photographers may use small lenses in the field, and magnify their pictures at home by the method described.